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10/730,524	12/08/2003	Hong Huynh	CIS03-56(8098)	2968

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EXAMINER

HOFFBERG, ROBERT JOSEPH

ART UNIT	PAPER NUMBER
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2835

DATE MAILED: 12/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/730,524

Applicant(s)

HUYNH ET AL.

Examiner

Robert J. Hoffberg

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 9-20 is/are rejected.
- 7) ☒ Claim(s) 7 and 8 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2/7/05.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

Detailed Action

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claim 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Prince et al. (US 6,208,517)

With respect to Claim 9, Prince et al. teaches a heat sink clip holder, comprising: a first surface mount contact (Fig. 5A, #130 mounted on left side of Fig. 2, #106, Col. 4, lines 3-5) configured to mount to surface mount pads (Col. 4, line 5) of a circuit board (Fig. 5, #106) using a surface mount technology soldering process (Col. 4, line 5), the first surface mount contact being disposed at a first end of the heat sink clip holder (Fig. 2, #104, left side); a second surface mount contact (Fig. 5A, #130 mounted on right side of Fig. 2, #106, Col. 4, lines 3-5) configured to mount to other surface mount pads (Col. 4, line 5) of the circuit board using the surface mount technology soldering process (Col. 4, line 5), the second surface mount contact being disposed at a second end of the heat sink clip holder (Fig. 2, #104, left side) which is opposite the first end; and a body portion (Fig. 2, #103 and 116) interconnected between the first surface mount contact and the second surface mount contact, the body portion being configured to fasten with a heat sink clip.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 3, 13-15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Prince et al. (US 6,208,517) in view of Smithers (US 5,640,305).

With respect to Claim 1, Prince et al. teaches a circuit board module, comprising: a circuit board having surface mount pads; a circuit board component (Fig. 2, #108) mounted to the circuit board (Fig. 5, #106); and a heat sink assembly including: a first clip holder (Fig. 5A, #130 mounted on left side of Fig. 2, #106, Col. 4, lines 3-5) and a second clip holder (Fig. 5A, #130 mounted on right side of Fig. 2, #106, Col. 4, lines 3-5), each clip holder being mounted to respective surface mount pads (Col. 4, line 5) of the circuit board using a surface mount technology soldering process, and a clip having a first portion (Fig. 2, #104, left side) configured to fasten to the first clip holder, a second portion (Fig. 2, #104, right side) configured to fasten to the second clip holder, and a third portion (Fig. 2, #103 and 116) coupled to the first and second portions, the third portion being configured to position the heat sink adjacent (see Fig. 2) the circuit board component when the first and second portions are respectively fastened to the first and second clip holders. The device of Prince et al. is integral with the heat sink. Prince et al. fails to teach a separate heat sink component. Smithers teaches a clip

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(Fig. 5, #20) to fasten a heat sink (Fig. 5, #21) to a circuit board component (Fig. 5, #22) mounted on a circuit board (Fig. 5, #18) using clip holders (Fig. 5, #10). It is obvious to one of ordinary skill in the art at the time of the invention was made to modify the circuit board module of Prince et al. with that of Smithers to have a separate heat sink component retained to the component by a clip. Separation of an integral part into components has been held to be obvious one of ordinary skill in the art. *In re Dulberg*, 289 F.2d 522, 523, 129 USPQ 348, 349 (CCPA 1961).

With respect to Claim 3, Prince et al. teaches a heat sink assembly, comprising: a first clip holder (Fig. 5A, #130 mounted on left side of Fig. 2, #106, Col. 4, lines 3-5) and a second clip holder (Fig. 5A, #130 mounted on right side of Fig. 2, #106, Col. 4, lines 3-5), each clip holder being configured to mount to surface mount pads (Col. 4, line 5) of a circuit board (Fig. 5, #106) using a surface mount technology soldering process; and a clip having a first portion (Fig. 2, #104, left side) configured to fasten to the first clip holder, a second portion (Fig. 2, #104, right side) configured to fasten to the second clip holder, and a third portion (Fig. 2, #103 and 116) coupled to the first and second portions, the third portion being configured to position the heat sink adjacent (see Fig. 2) a circuit board component (Fig. 2, #108) on the circuit board when the first and second clip holders are mounted to the surface mount pads of the circuit board and when the first and second portions are respectively fastened to the first and second clip holders. Prince et al. fails to show a separate heat sink component. Smithers teaches a clip (Fig. 5, #20) to fasten a heat sink (Fig. 5, #21) to a circuit board component (Fig. 5, #22) mounted on a circuit board (Fig. 5, #18) using clip holders (Fig. 5, #10). It is

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obvious to one of ordinary skill in the art at the time of the invention was made to modify the circuit board module of Prince et al. with that of Smithers to have a separate heat sink component retained to the component by a clip.

Regarding method claims 13 and 15, the method steps recited in the claims are inherently necessitated by the device structure as taught by Prince et al., in view of Smithers as recited above in the rejection to claims 1 and 3.

With respect to Claim 14, Prince et al. further teaches wherein the second clip holder (Fig. 5A, #130 mounted on right side of Fig. 2, #106, Col. 4, lines 3-5) defines a cavity (see Fig. 5A) which extends in a direction that is substantially parallel to a plane of the circuit board (Fig. 5A, #106); wherein the method further comprises: after the first end (Fig. 2, #104, left side) of the clip is fastened to the first clip holder (Fig. 5A, #130 mounted on left side of Fig. 2, #106, Col. 4, lines 3-5), bending (Col. 4, line 7, inward) the clip to align the second end (Fig. 2, #104, right side) of the clip with the cavity defined by the second clip holder.

With respect to Claim 17, Prince et al. teaches a heat sink assembly, comprising: surface mounting means (Fig. 5A, #130 mounted on Fig. 2, #106, Col. 4, lines 3-5) for surface mounting to surface mount pads of a circuit board using a surface mount technology soldering process (Col. 4, line 5), and a clip (Fig. 2, #103, #104 and #116) having a first portion (Fig. 2, #104, left side) configured to fasten to the surface mounting means, a second portion (Fig. 2, #104, right side) configured to fasten to the surface mounting means, and a third portion (Fig. 2, #103 and #116) coupled to the first and second portions, the third portion being configured to position (see Fig. 2) the heat

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sink adjacent a circuit board component (Fig. 2, #108) on the circuit board (Fig. 2, #106) when the surface mounting means mounts to the surface mount pads of the circuit board and when the first and second portions are fastened to the surface mounting means. Prince et al. fails to show a separate heat sink component. Smithers teaches a clip (Fig. 5, #20) to fasten a heat sink (Fig. 5, #21) to a circuit board component (Fig. 5, #22) mounted on a circuit board (Fig. 5, #18) using clip holders (Fig. 5, #10). It is obvious to one of ordinary skill in the art at the time of the invention was made to modify the circuit board module of Prince et al. with that of Smithers to have a separate heat sink component retained to the component by a clip.

5. Claims 2, 4, 5, 10, 12, 18 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Prince et al. (US 6,208,517) in view of Smithers (US 5,640,305) as applied to the above claims, in view of Fukui (US 5,270,492).

With respect to Claims 2 and 4, Prince et al. further teaches wherein each clip holder is elongated (see Fig. 5A) in shape and includes (i) a first surface mount contact at first end (Fig 2, #112, left side, Col. 3, lines 64-65, alternate #130) and (ii) a second surface mount contact at a second end (Fig 2, #112, right side, Col. 3, lines 64-65, alternate #130) opposite the first end. Prince et al. fails to teach the apertures which are substantially perpendicular to the plane. Fukui teaches wherein the surface mount contacts (Fig. 1, #2) of each clip holder define apertures (Fig. 1, #6) which are substantially perpendicular to a plane of the circuit board. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify heat

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sink clip of Prince et al. in view of Smithers with that of Fukui to incorporate apertures in the clip holders to improve solderability.

With respect to Claim 5, Prince et al. further teaches wherein the surface mount contacts of each clip holder define a plane which is substantially parallel (see Fig. 5A) to the circuit board when that clip holder mounts to the surface mount pads of the circuit board. Prince et al. fails to teach the apertures which are substantially perpendicular to the plane. Fukui teaches wherein the surface mount contacts (Fig. 1, #2) of each clip holder further define apertures (Fig. 1, #6) which are substantially perpendicular (see Fig. 1) to the plane. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify heat sink clip of Prince et al. in view of Smithers with that of Fukui to incorporate apertures in the clip holders to improve solderability.

With respect to Claim 18, Prince et al. in view of Smithers further teach wherein the surface mounting means include a set of clip holders (Prince et al., Fig. 5A, #130), each clip holder being elongated in shape and including (i) a first surface mount contact (Fig. 5A, #132, left side) at a first end and (ii) a second surface mount contact (Prince et al., Fig. 5A, #132, right side) at a second end opposite the first end. They do not teach a means for percolating gas therethrough. Fukui teaches wherein each surface mount contact (Fig. 1, #2) including means for percolating gas (Col.2, lines 31-33) therethrough. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify heat sink clip of Prince et al. in view of Smithers with that of Fukui to incorporate apertures in the clip holders to improve solderability.

With respect to Claim 20, Prince et al., in view of Smithers, in further view of Fukui teaches the heat sink assembly of claim 18. Smithers further teaches wherein each clip holder further includes: means for electrically connecting (Col. 2, line 32, wire spring) the clip (Fig. 5, #20) to the first and second surface mount contacts (Fig. 5, #10) of that clip holder. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify heat sink clip of Prince et al. in view of Smithers with that of Fukui to ground the circuit board component to the circuit board to provide an electromagnetic interference shielding.

6. Claims 6 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Prince et al. (US 6,208,517), in view of Smithers (US 5,640,305), in further view of Fukui (US 5,270,492) as applied to the above claims, in view of Tanaka et al. (US 5,249,977).

With respect to Claim 6, Prince et al., in view of Smithers, in further view of Fukui teaches the heat sink assembly of claim 5. They do not teach the details of the clip holder. Tanaka et al. teaches wherein each clip holder further includes: a non-conductive (Col. 4, lines 7-8, plastic) body portion (Fig. 6, #65a) interconnected between the first (Fig. 1, #19 left side) and second (Fig. 1, #19 right side) surface mount contacts of that clip holder, the non-conductive body portion defining a surface (Col. 1, lines 17-20) to interface with automated pick and place equipment (Col. 1, line 18). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify heat sink clip holder of Prince et al. in view of Smithers with that of Tankara et al. to provide a flat surface to automate the assembly process.

With respect to Claim 19, Prince et al., in view of Smithers, in further view of Fukui teaches the heat sink assembly of claim 18. They do not teach a means for interfacing with automated pick and place equipment. Tanaka et al. teaches wherein each clip holder further includes: interfacing means (Fig. 1, #2a) for interfacing with automated pick and place equipment (Col. 1, line 18). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify heat sink clip of Prince et al., in view of Smithers, in further view of Fukui with that of Tanaka et al. to automate the assembly process.

7. Claims 10 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Prince et al. (US 6,208,517) as applied to the above claims, in view of Fukui (US 5,270,492).

With respect to Claims 10, Prince et al. further teaches wherein the surface mount contacts define a plane which is substantially parallel (see Fig. 5A) to the circuit board when the heat sink clip holder mounts to the surface mount pads of the circuit board. Prince et al. fails to teach the apertures which are substantially perpendicular to the plane. Fukui teaches the apertures (Fig. 1, #6) which are substantially perpendicular to the plane. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify heat sink clip of Prince et al. in view of Smithers with that of Fukui to incorporate apertures in the clip holders to improve solderability.

With respect to Claim 12, Prince et al. further teaches wherein the body portion defines a cavity for engaging with the heat sink clip, the cavity extending in a direction that is substantially parallel (see Fig. 5A) to the plane.

8. Claims 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Prince et al. (US 6,208,517) in view of Fukui (US 5,270,492) as applied to the above claims, in further view of Tanaka et al. (5,249,977).

With respect to Claim 11, Prince et al. in view of Fukui teaches the heat sink clip holder of claim 10. They do not teach the body portion of the clip holder. Tanaka et al. teaches wherein the body portion (Fig. 6, #65a) defines a surface (Col. 1, lines 17-20) to interface with automated pick and place equipment. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify heat sink clip holder of Prince et al. in view of Fukui with that of Tankara et al. to provide a flat surface to automate the assembly process.

9. Claims 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Prince et al. (US 6,208,517) in view of Smithers (US 5,640,305), in further view of Degani et al. (US 5,346,118), in further view of Tanaka et al. (US 5,249,977) in further view of Fukui (US 5,270,492).

With respect to Claim 16, Prince et al. in view of Smithers further teaches wherein mounting includes: disposing the first and second clip holders (Prince et al., Fig. 2, #104) over the surface mount pads (Prince et al., Col. 4, line 5) of the circuit board (Prince et al., Fig. 5, #106). Degani et al. teaches the surface mount technology process of circuit board in contact with printed solder paste (Col. 3, line 43); and

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applying heat to melt (Col. 3, line 44) the printed solder paste and activate flux (Col. 3, line 46) within the printed solder paste (Col. 3, line 45). Tanaka et al. further teaches using automated pick and place equipment (Col. 1, line 18). Fukui teaches percolate gas (Col. 2, line 32) through apertures (Fig. 1, #6) defined by the first and second clip holders (Fig. 1, #2). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the method of Prince et al. in view of Smithers with that of Degani et al., in further view of Tanaka et al. and in further view of Fukui to assemble using an automated surface mount technology process and configure for improved solderability.

Allowable Subject Matter

10. Claims 7 and 8 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: Claims 7 and all claims dependent thereof are allowable over the art of record because the prior art does not teach or suggest that a cooling unit comprising of a "heat sink", a set of "clip holders" with perpendicular "apertures" and a "non-conductive body portion" with "a surface to interface with automated pick and place equipment" configured to be mounted on a "circuit board" using "surface mount technology solder process" to hold the heat sink against a "circuit board component" using a "clip", to the electronics, a "control valve" regulating the temperature of the loops, and "system coolant tank" containing the heat exchanger inside of it. The aforementioned limitations

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in combination with all remaining limitations of the respective claims are believed to render said claims 7 and all claims dependent thereof patentable over art of record.


Conclusion

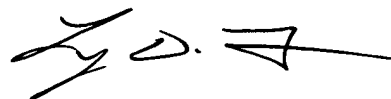
11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Kiyose (US 4,991,059), Kogure et al. (US 5,148,349), Torigian et al. (US 6,623,283) and Downes (US 6,552,277) teach using holes, channels and grooves, respectively, to improve solder joint.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert J. Hoffberg whose telephone number is (571) 272-2761. The examiner can normally be reached on 8:30 AM - 4:30 PM Mon - Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynn D. Feild can be reached on (571) 272-2092. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

RJH 



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